

CLAIMS

1. A method for purifying a fluid which comprises, in purifying a fluid, such as an exhaust gas and waste water, utilizing a static mixer which is provided with a mixer main body which is arranged on a fluid flow path and is formed in a cylindrical shape having a diameter greater than that of the fluid flow path, the mixer main body comprising a mixer main body cylindrical unit, a hollow inlet disk unit having a hollow part which is positioned at the end of the mixer main body cylindrical unit and serves as an inlet, and a hollow outlet disk unit having a hollow part which is positioned at the other end of the mixer main body cylindrical unit and serves as an outlet, wherein a collision cylinder having a diameter greater than or equal to that of the inlet of the mixer main body and smaller than the inside diameter of the mixer main body cylindrical unit of the mixer main body is fixedly housed concentrically in the mixer main body so that the side of the opening of the collision cylinder faces to the inlet, a number of depressions are provided on at least one part of the interior face of the mixer main body and the surface of the collision cylinder which have contact with the fluid, arranging on the fluid flow path at least one of the static

mixers,

occurring a mixed reaction between the fluid, such as the exhaust gas and the waste water, and a depurative, such as ozone, and

purifying the fluid.

2. A method for purifying a fluid which comprises, in purifying a fluid, such as an exhaust gas and waste water,

utilizing a static mixer which is provided with a mixer main body which is arranged on a fluid flow path and is formed in a cylindrical shape having a diameter greater than that of the fluid flow path, the mixer main body comprising a mixer main body cylindrical unit, a hollow inlet disk unit having a hollow part which is positioned at the end of the mixer main body cylindrical unit and serves as an inlet, and a hollow outlet disk unit having a hollow part which is positioned at the other end of the mixer main body cylindrical unit and serves as an outlet, wherein a collision cylinder having a diameter greater than or equal to that of the inlet of the mixer main body and smaller than the inside diameter of the mixer main body cylindrical unit of the mixer main body is fixedly housed concentrically in the mixer main body so that the side of the opening of the collision cylinder faces to the inlet, either

a groove or a protrusion, or both is provided on at least one part of the interior face of the mixer main body and the surface of the collision cylinder which have contact with the fluid, arranging on the fluid flow path at least one of the static mixers,

occurring a mixed reaction between the fluid, such as the exhaust gas and the waste water, and a depurative, such as ozone, and

purifying the fluid.

3. A method for purifying a fluid according to claim 1 or 2, wherein the depression, the groove, or the protrusion of the static mixer is provided on at least one part of the interior side of the bottom face of the collision cylinder, the inner peripheral face of the cylindrical part of the collision cylinder, the interior face of the hollow inlet disk unit of the mixer main body, and the interior face of the hollow outlet disk unit of the mixer main body.

4. A method for purifying a fluid according to claim 2 or 3, wherein the groove and the protrusion of the static mixer provided on a plane which has contact with the fluid and faces the flow of the fluid are formed in volute shapes, and the groove

and the protrusion of the static mixer provided on a peripheral face which has contact with the fluid and places along the flow of the fluid are formed in spiral shapes.

5. A method for purifying a fluid according to any one of claims 2 to 4, wherein either the groove or the protrusion, or both, of the static mixer are provided on either the interior side of the bottom face of the collision cylinder or the inner peripheral face of the cylindrical part of the collision cylinder, or both.

6. A method for purifying a fluid according to any one of claims 1 to 5, wherein the upstream end of the outlet cylindrical part of the hollow outlet disk unit or the upstream end of the downstream side fluid flow path is protruded into the mixer main body of the static mixer.

7. A static mixer comprising a mixer main body which is arranged on the fluid flow path and is formed in cylindrical shape having a diameter greater than that of the fluid flow path, the mixer main body comprising a mixer main body cylindrical unit, a hollow inlet disk unit having a hollow part which is positioned at the end of the mixer main body cylindrical

unit and serves as an inlet, and a hollow outlet disk unit having a hollow part which is positioned at the other end of the mixer main body cylindrical unit and serves as an outlet,

wherein a collision cylinder having a diameter greater than or equal to that of the inlet of the mixer main body and smaller than the inside diameter of the mixer main body cylindrical unit is fixedly housed concentrically in the mixer main body so that the side of the opening of the collision cylinder faces to the inlet,

either a groove or a protrusion, or both is provided on at least one part of the interior face of the mixer main body and the surface of the collision cylinder which have contact with the fluid.

8. A static mixer according to claim 7, wherein the groove and the protrusion are provided on at least one part of the interior side of the bottom face of the collision cylinder, the inner peripheral face of the cylindrical part of the collision cylinder, the interior face of the hollow inlet disk unit of the mixer main body, and the interior face of the hollow outlet disk unit of the mixer main body.

9. A static mixer according to claim 7 or 8, wherein the

groove and the protrusion provided on a plane which has contact with the fluid and faces to the flow of the fluid are formed in volute shapes, and the ones provided on a peripheral face which has contact with the fluid and places along the flow of the fluid are formed in spiral shapes.

10. A static mixer according to any one of claims 7 to 9, wherein either the groove or the protrusion, or both is provided on either the interior side of the bottom face of the collision cylinder or the inner peripheral face of the cylindrical part of the collision cylinder, or both.

11. A static mixer according to any one of claims 7 to 10, wherein the upstream end of the outlet cylindrical part of the hollow outlet disk unit or the upstream end of the downstream side fluid flow path is protruded into the mixer main body.

12. A method for mixing fluids comprising, in mixing between two fluid mutually,

arranging one or more of the static mixers according to any one of claims 7 to 11 on a fluid flow path, and
mixing and reacting one fluid with the other fluid in the static mixer to mix the fluids each other.